

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Anna Gorokhova
Student number	5517915

Studio		
Name / Theme	Water Landscapes of Crisis and Hope	
Main mentor	Laura Cipriani	Landscape Urbanism
Second mentor	Diego Andres Sepulveda Carmona	Urbanism
Argumentation of choice of the studio	<p>"Water Landscapes of Crisis and Hope" is a graduation studio lead by Laura Cipriani based in the Wadden Sea region. One of the main reasons for choosing the lab was my initial fascination with the area: rich cultural history, openness of the landscape with an endless horizon and proximity to the sea, whilst being extremely vulnerable and sensitive - under a threat of climate change, overexploitation, pressure on biodiversity, etc. The initial fascination with the complexity of the area and my curiosity in tackling the vulnerabilities lead me to choose the graduation studio.</p>	

Graduation project	
Title of the graduation project	Ruralities in Transition: Agriculture in light of climate change
Goal	
Location:	Friesland, Netherlands
The posed problem,	<p>[The Wadden Sea Region is an extensively complex landscape, which has developed over the past 150 years by the influence of mankind. Mankind acted as a geological force, shaping the land in an ongoing battle against the sea. As the time passed, the landscape lost its dynamic relationship with the water and became significantly more static, changing the human relationship with the landscape and creating more opportunities for agricultural and urban expansion. With the increasing human desire to grow and develop, Friesland and</p>

Groningen became the largest dairy and potato seed exporters in the country, turning over 70% of the landscape into agricultural land (Agrifood, 2023).

Climate Change has already impacted the Wadden Sea region. Due to sea level rise, water management is becoming progressively more difficult in Friesland. The arable land along the coast is experiencing salinization, pushing the current agricultural practices to search for new salt resistant crops (Regio deal Natuurinclusieve Landbouw, 2021). Due to soil subsidence, the natural areas are experiencing droughts as they are becoming increasingly elevated in comparison to the urban and agricultural lands that are subsiding. Due to the excessive agriculture, the groundwater levels are steadily dropping resulting in excess water accumulating further inland and in the desiccation of sandy soils leading to further salinization (Regio deal Natuurinclusieve Landbouw, 2021). The drop in groundwater levels and accumulation of excess water also leads to peat oxidation resulting in greenhouse emissions pushing the current policymakers to pursue radical CO2 reduction goals, especially in peat areas, putting an immense pressure on farmers to transition into more climate adaptive and sustainable practices.

The Wadden Sea Region forms a dynamic and biodiverse coastal landscape, benefiting the ecosystem and society. With highly rich flora and fauna, it is an important breeding ground for hundreds of thousands of migrating birds and other animals (van der Windt & Swart, 2017). The dairy industry highly impacts soil and surface water quality releasing ammonia and phosphate into the environment contributing to the biodiversity decline and climate change. The increasing competition between agriculture and nature puts ammonia and nitrogen-sensitive species under a declining threat (van der Windt & Swart, 2017). The Wadden Sea Region has a rich cultural heritage, representing centuries-long relationships of the local inhabitants with the sea (Ecosystem 12: Landscape and cultural heritage in the Wadden Sea Region, 2000). The

	<p>homogenization of the landscape mostly due to the modern upscaling of agricultural farming not only creates a threat for biodiversity but also for the cultural landscape. The homogenization of the landscape contributes towards climate vulnerability of the region.</p> <p>Nowadays, the ruralities of Friesland are facing a great challenge to transition to become more climate adaptive, whilst being biodiversity and cultural heritage inclusive leading to the research question and sub-research questions...]</p>
<p>research questions and</p>	<p>[How can the agricultural practice transition in becoming more resilient in the province of Friesland?</p> <p>Sub Questions:</p> <ul style="list-style-type: none"> - What is the history of agricultural practice in Friesland and its current state? - What are the opportunities and threats regarding the environmental, cultural, and socio-economic aspects of agriculture? - What are the climatic threats and how will the issues impact agriculture in the future? - How to create a natural and cultural heritage inclusive resilient agricultural landscape? - What are the alternative landscape agricultural practices, which could respond to future climatic issues?]
<p>design assignment in which these result.</p>	<p>[Landscape Resilience, specifically in the form of Agricultural Resilience, is at the core of the proposed theoretical framework. Resilience - is the ability of a landscape to sustain desired functions and critical landscape processes over time, under changing conditions. (Beller, Robinson, Grossinger, Grenier, Letitia, 2015). The paper aims to research the transition steps and propose a design for the hinterland to maintain its productive functions under the threat of climate change. Climate-adaptive agriculture, nature-inclusive agriculture, and</p>

	<p>preservation of cultural heritage incorporate the concept of resilience.</p> <p>The design assignment aims to reflect on the future of the Friesland agricultural landscape, especially its east side with peat and clay soils, in light of climate change whilst honoring the biodiversity and cultural heritage of the region. How can the agricultural landscape transition to becoming more sustainable and climate change resilient? What could the landscape look like in 30, 50, and 100 years? The design assignment aims to involve the local stakeholders to understand the site's needs and its capacities in responding to pressing issues and transition goals. The design assignment aims to be site-specific working closely with farms located in different conditions, peat, and clay soils. The design assignment aims to assess the government transition goals, its impacts on the hinterland landscape, and the capacities of the rural landscape to respond to the necessary changes to maintain its productive functions under the threat of climate change, contributing to the resilience of the hinterland.]</p>
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Process

Method description

[Method Description:

Multiple research strategies contributed/ will contribute towards the understanding and speculation of the area.

- **What is the history of agricultural practice in Friesland and its current state?**

Description

In order to have a comprehensive understanding of the region, descriptive tools are being used, specifically in the form of collecting geo data, (historical) maps, figures, news, articles, and texts. etc. PDOK and QGIS were mainly used to spatialize the collected data and to produce maps and sections for the Netherlands region. CBS, Friesland.Databank and Fryske Academy were used for statistics and figures within the Netherlands. The European Environmental Agency and Geofabric were used for the geo data necessary for Denmark and Germany and Eurostat provided the necessary statistics data. The research strategy allowed the initial understanding of the area, its history and current socio - economic structure.

Observation

The primary area visit to the Frisian coast allowed a better understanding of the area through active immersion into the landscape. Tools like photographing and sketching contributed

towards a better perception of the area. The combination of the primary visit with descriptive data collection allows for a better connection with the land. The visit allowed us to collect data that is less attainable through other descriptive tools and contributed towards raw data collection that later could be interpreted and speculated upon. Through the primary visit unique landscape features like openness, vast horizon view, and sense of “exposure” were identified. I am planning to site visit the farms that I am in contact with to have a more comprehensive understanding of the area, where I am aiming to do my small-scale design. The collected information will later be used in the design phase to create an experiential landscape.

- **What are the opportunities and threats regarding the environmental, cultural, and socio-economic aspects of agriculture?**

Interpretation

Interpreting the collected data and overlapping different maps and statistics allows us to identify vulnerabilities and critical areas. Superimposing and merging different geo data allows to construct a narrative around different relationships and patterns, which could have an impact on the future of the landscape. The research strategy allowed me to identify conflicts between current productive land use and Natura2000 areas, which are competing, and areas prone to peat oxidation and salinization that are further impacting local agricultural practices. Moreover, croplands are usually located at the fertile clay area, which is located at the coast and land subsidence occurs at the peat landscapes, where most of the Dairy farming is located. The research strategy allows to link different patterns and locate threats impacting the design decisions.

- **What are the future climatic issues and how will the issues influence agriculture in the future?**

Modelling and Interpretation

Using predictions not limited to QGIS such as government reports regarding future peat oxidation, salinization, soil subsidence will allow spatialization of the critical areas and, thus, areas in need of implementing necessary strategies for climate adaptation/mitigation. Moreover, it allows one to visualize and speculate on the future and derive challenges and opportunities for climate adaptation and mitigation in the project. Interpretive modelling is a vital research tool in deriving conditions to which a resilient landscape needs to respond to.

- **How to create a natural and cultural heritage inclusive resilient agricultural landscape?**

Classification

Classification of different historical cultural patterns and typologies (terps, dikes, mills, etc) used for agriculture has a positive impact on constructing a better image of the current cultural heritage landscape and, thus, will create a base for creating necessary strategies for its preservation and empowerment as it has been greatly homogenized due to agricultural expansion. Classification of cultural heritage existing in Friesland allows a better understanding of the cultural landscape and later will act as a base for constructing existing and future relationships between culture, nature and agriculture and the impacts of climate on it.

DESIGN STAGE

Evaluation

Looking into the proposed government ambitions for the area serves as a basis for understanding issues and dilemmas that the government is confronting. A great addition

towards understanding the issues and dilemmas of the area is to talk to the local stakeholders. The Frisian landscape architect Stephan Smeijers and the head of the Westergo Agrarian Cooperative Sybe van de Schaar kindly shared information about Friesland and the current pressing agricultural challenges of the region. I am planning to further contact local farmers in order to have not only a better understanding but a valid contribution, as local people are the main caregivers and creators of the landscape. I am also planning to visit farms that have already raised their water levels in the desire to preserve the peat agricultural landscape or are working on the preservation of meadow birds to see what has been done, what are the impacts of the implemented strategies on agriculture and what could be done on the site for climate adaptation/mitigation and nature, culture preservation. The evaluation research will allow me to derive design strategies necessary for making the landscape more resilient, finding the middle ground between agriculture, nature/ culture and climate threats. Moreover, it will allow me to foresee the agricultural landscape capacities in relation to the government transition goals further highlighting possibilities and opportunities in the design stage.

- **What are the alternative landscape agricultural practices, which could respond to future climatic issues?**

Design Projection

Using projections to predict landscape changes in the coming 30, 50 and 100 years to propose design strategies for climate mitigation/ adaptation of agriculture. Working through multiple scales (Wadden sea, North Netherlands, Friesland, East Friesland, Farm) to establish design strategies that are linked with each other and communicate well both on regional and small scales whilst showcasing the impacts of the regional strategies on the ground through detailed small-scale design. The projections would be explored through map interpretation and modelling of different climatic scenarios. Design projections are the speculations on what could be done to the agricultural landscape for it to be able to maintain productive properties amidst climatic changes and threats.

Framework

To summarize description, observation, interpretation, classification, and modelling were used for the initial regional and large-scale research of the area contributing to the general understanding of the existing and pressing issues and future threats. The methods allowed me to construct the preliminary narrative and to identify the current and future vulnerabilities and possibilities of the Frisian agricultural hinterland. Evaluation of the collected information allowed me to further go down in scale and will further allow me to explore the capacity of the Frisian hinterland to respond to future climatic changes. The design projection method allows visualizing the future conditions to which the hinterland needs to respond to. Communicating with the local stakeholders (description, observing) is a vital part of the research and the design process for identifying the capacities of the local landscape in implementing regional strategies and reducing the gap in reaching the governmental transition goals. Continuously using the description, observation, interpretation, and evaluation methods throughout the design process of different scales allows to construct a stronger design narrative. Research by design is a primary method in which research goes hand in hand with the design and explores vulnerabilities, opportunities, and capacity of the landscape to respond to the identified risks through time.]

Literature and general practical reference

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Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

Landscape architecture involves the planning, design, management, and nurturing of the built and natural environments. With their unique skill set, landscape architects work to improve human and environmental health in all communities. The thesis investigates the issues and challenges the agricultural landscape is facing and creates a narrative around the relationships of past, present and future of agriculture and nature and agriculture and culture. The thesis explores the impacts of climate change on the agricultural landscape in Friesland and aims to derive different strategies as a response for climate change to create biodiversity and cultural heritage inclusive resilient rural agricultural landscape.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Climate change is a highly pressing threat to our society. It directly impacts the natural environment and intervenes with the natural processes, causing even higher threats to the way we live and exist. Climate change has already impacted agriculture, putting at risk food production creating a threat for food security in the future. Changes need to be done now in order to secure sustainable food production, natural and cultural heritage for the future generations. Therefore, looking into possible strategies for adapting agriculture and mitigating climate change is of high relevance to our society.